

As can be seen by comparing figures 3 and 4, while the Cohort II had a higher percentage of Preceptors at stage one than did Cohort I (90% as compared to 80%), it appears that Cohort II Preceptors were slightly quicker to incorporate the importance of relationships into their role than did Cohort I.

Other Findings Related to the Development of Leadership

Even though large differences are not noted between Figures 3 and 4 above, i.e. the two Cohorts are progressing through leadership stages in similar manners, it is apparent from site visits made by evaluators and the project director to Mathematics Professional Seminars (MEPS) and start-of-year Beginning Teacher Institutes, that more activities involving issues pertinent to teaching English Learners in particular, and issues of race, class and gender and their effects on mathematics classroom practices are being led by this newer Cohort. There are several possible explanations for this. One is that the structure of the project, of having an overlap year between Cohort I and Cohort II, allows the Cohort II team to pick up where the others left off. In some districts, Preceptees have been participating in the project for two or more years and now may be *ready* to tackle more challenging issues. Another explanation is that Cohort II is comprised of more teachers of color than Cohort I (1/2 versus 1/3) some of whom may be more experienced in thinking about such issues.

4. Continued Growth of Preceptors' Pedagogical Content Knowledge

- a. Preceptors self reported gains in key areas of mathematics learning: greater understanding of how students learn by being placed themselves in the position of the learner; greater confidence in themselves as a

learner of mathematics; deeper understanding of important mathematics concepts.

Last year we reported results from the analyses of a concept map study that was conducted in the context of the Cohort II Summer Institute (Hough, Weissglass, et. al, 2005). We found that, as a result of participating in RENEW mathematics activities, Preceptors increased their content knowledge. As year IV progresses we find that this growth continues. The Cohort II Preceptors are self reporting gains in key areas of mathematics learning. In particular they have a better understanding of how student learn.

I have developed a greater understanding for the needs of the student, who have not experienced math, taught using materials that challenge their thinking and at the same time relates to their life experiences I have seen students grow with a greater understanding of math.

Many report that they have a greater confidence in themselves as learners of mathematics.

RENEW has increased my confidence in myself as a learner. The safe environment allows participants to take a chance and share their thinking or try something new.

And most importantly they report that they have gained a deep understanding of important mathematics concepts as a result of participation.

RENEW has helped me to understand mathematics at a much deeper level. By presenting new concepts in such a systematic way-developing vocabulary and concepts with simpler tasks which lead into more complex problems which take time and talking and exploring to solve, my learning of complex mathematics has been scaffolded and I am able to understand more in depth.

Opportunities to be challenged beyond primary math has helped to deepen my understanding of important mathematics. It's often an ahaa! RENEW also helps by the in depth focus on a strand such as algebra or geometry, and group discussions.

b. Preceptors beliefs about teaching mathematics become more reform oriented and in line with those of NCTM.

The Cohort II Preceptors entered the project at the start of Year III with slightly different views about teaching mathematics than their Cohort I counterparts. We reported last year that a few, when asked to articulate their vision of the ideal mathematics classroom, were entrenched in more traditional mathematics classroom practices reminiscent of the three-set process stated in the California Framework for Mathematics and not in line with the *Principles and Standards for School Mathematics* (NCTM, 2000). Analyses of Cohort II responses to *The Beliefs About Teaching Mathematics Scale* verified these claims (see Table 6).

Table 6. Pre/Post Differences for Cohort II on the Non-Telling variable

| Mean | | Std. Dev | |
|------------|------------|----------|------|
| Pre (N=26) | Post(N=21) | Pre | Post |
| 3.8 | 4.1* | .61 | .63 |

*significant pre/post difference at $p=.05$ level.

An ANOVA using the Non-telling variable as dependent variable indicated significant differences between initial and post one year' participation in the project ($(F(46)=3.9, p=.05)$).

c. Preceptors are better able to articulate and implement their own vision of mathematics into their classrooms.

To see how well Preceptors from Cohort II were able to act upon their beliefs and understandings about mathematics and its teaching we mirrored the analyses done with Cohort I. On entering the project, Cohort II were asked to describe their view of an "ideal mathematics classroom" as part of the *Initial Preceptor*

Questionnaire. Cohort II Preceptors have less teaching experience (average is 9 years) overall than their colleagues in Cohort I (average is 16 years), and less affiliations with previous CECIMS projects, yet most of them entered the project last year with views of the ideal classroom similar to those of their Cohort I. Many of Cohort II Preceptor views were consistent with the *Principals and Standards for School Mathematics*, (NCTM 2000) and served to triangulate the quantitative result above. Most Cohort I Preceptors describe “ideal” classrooms as those in which students use manipulatives, participate actively in small groups, explore or investigate math problems with real-life connections, form conceptual understandings, process their learning, play games, love mathematics and feel safe. They see this as a child-centered, investigative approach to teaching mathematics. Most Preceptors said that the role of the teacher in these kinds of settings is that of a facilitator or guide for children’s learning, rather than that of a “teller”, while keeping in mind that a balanced approach to teaching for many topics would be appropriate. Some mentioned the importance of the teacher in forming a sense of community in the classroom (e.g., in order for students to take risks with their learning) and in making sure that all students have access to learning opportunities. However, five of these new Preceptors had views that were more traditional in nature and seemed to be focused initially on the 3-step procedures laid out in the California Framework for School Mathematics.

Begin with homework collection. Warm up or review of homework. New lesson with examples. Students put problems on board and present to classmates. Time for guided practice. Maybe small groups to begin work or at least partners. Ending with quick review of daily objective. [Example Cohort II Preceptor A]

Meeting all the state standards through curriculum integration with plenty of time for review and practice. [Example Cohort II Preceptor B]

Participating in RENEW activities has an effect on beliefs about what a mathematics classroom should look like. Our end-of-year analysis indicated that all five of these Preceptors had modified their views about mathematics classrooms in a manner that was more consistent with the *Principles and Standards for School Mathematics* (NCTM, 2000).

I would like to add in more group work and time for dyads or students to reflect. Wouldn't it be wonderful to have an activity like today's map activity for each week! Or each major topic? [Example Cohort II Preceptor A]

The maps activity was one in which participants compared the size and shape of certain countries as represented on different map projections. They then discussed: (1) adapting this activity to various grade levels and (2) which NCTM standards and which California Mathematics Standards could be covered by implementing such an activity. Several district teams have implemented this activity in MEPS with their Preceptees.

I would like to add words such as individualized and meaningful and place an emphasis on hands-on exploration. I would also like to add an emphasis on problem-solving and really allowing each child time to talk through their problem solving approaches. [Example Cohort II Preceptor B]

Although both pre and post Year III the majority of responses to this "ideal classroom" prompt were in line with the NCTM standards for mathematics classrooms, more than 45% of Cohort II Preceptors stated that there were aspects of this classroom that they were not able to implement during the year prior to the start of the project. At the end of one year's participation in the project, three-quarters of these Preceptors commented that they now felt more supported and

were better able to implement the types of mathematics classrooms that they envisioned for children.

My classroom was much closer to my ideal this year and as I continue to grow in RENEW and my understanding deepens, my classroom will become more of an ideal classroom. This year I based my program in Investigations and Explorations and did not use the adopted text. My principal supported me in this decision. Through a variety of investigations, math games, etc. my children developed conceptual understanding, regularly shared strategies and understood relationships among topics. [Example Cohort II Preceptor C]

Asked at the end of Year III what specific support they need from RENEW, Cohort II Preceptors stated that the Preceptor Days and year-round academic support in which they get opportunities to share knowledge and materials with peers to be crucial to their success in doing meaningful mathematics with their Preceptees and with the students in their own classrooms.

The Preceptor Days which we attend are crucial to us. We get so many ideas which we use at our own MEPs. Your support this past year has been instrumental in our success and if you keep doing what you're doing, that's perfect!

The support that is important to me is the collegiality of my fellow preceptors and leadership team. Being able to share ideas, problems, and success stories makes me a better person and teacher. The issues that are discussed at our seminars allow me to grow as a professional. Project RENEW has opened up a lot of thoughts and experiences that I would have never reflected on.

We are going to need continued support from our administration and staff. With our new Language Arts program and continued pressures for accountability, in some instances, it seems to be moving Math to the "back burner". One way RENEW could assist is by continuing to train us with activities that integrate science, social studies or Language Arts into Math activities – when possible.

4. The Retention of RENEW Participants

Considerable data has been collected to examine if and how RENEW is satisfying the self-reported needs of beginning teachers and hence helping to retain them in the profession. It is well known in the research literature that beginning teachers need much support in the areas of: gathering curriculum resources, dealing with classroom management and discipline, feelings of isolation, help with planning and carrying out evaluation of students during the first years of their transition from teacher education program to effectively teaching in their own classroom (Odell, 1990; Erbes, 1999). Furthermore there are areas of pedagogical reasoning such as gaining pedagogical content knowledge (PCK)—that special amalgamation of understandings of subject matter, curriculum, student and pedagogy that allows an experienced teacher to transform their knowledge into a form that is readily understandable to their student, that prove difficult for the novice. (Shulman, 1986; Clermont, 1994). Though several studies have addressed PCK in relationship to beginning teachers of mathematics (Langrall 1996) and have found it a problem area in this specific case, to date little is known about the self-perceived needs of beginning teachers that is specific to their teaching mathematics. Pre-post year data is collected from each Preceptee on their self perceived needs as part of the *RENEW Beginning Teacher Questionnaire*. The ten Preceptee needs categories in Table 1 below were derived from a constant comparative analysis (Strauss, 1987) of responses to an open-ended prompt that asked the Preceptee to tell in as much detail as possible, what they needed from the project. Inter-rater reliability was calculated after a second coder was trained and recoded the responses and a

Kappa coefficient of .91 was obtained. In the end-of-Year III *Beginning Teacher Questionnaire*, Preceptees were asked again, the extent to which they felt they had received support in each category. These results are also depicted in Table 7 below.

It is clear from responses to needs questions that Preceptees feel supported in these needs categories.

Table 7. *The Self Perceived Needs of Preceptees: Are They Being Met by RENEW?*

| Need category and example | % of Preceptees felt that they received support in category | | |
|--|---|------|------------|
| | A lot | Some | Not at all |
| <u>Curriculum</u> | | | |
| Investigative/hands-on activities and strategies e.g. <i>"Ideas for hands on project based work--actual projects and how to apply them"</i> | 71% | 27% | 2% |
| Materials for specific concepts e.g. <i>"I would like access to the many tools out there that could be used to teach place value, addition and Subtraction in a fun and interesting way for children."</i> | 82% | 17% | 1% |
| Curriculum mapping what and when. e.g. <i>"How do I organize curriculum/teaching--planning out for the year to teach everything."</i> | 48% | 46% | 6% |
| <u>Content</u> | | | |
| A renewed interest and understanding of mathematics e.g. <i>"I would like to be able to think more "outside the box" when it comes to math. I'm not a mathematical thinker and I just love the opportunities to receive ideas, feedback, and strategies from others."</i> | 83% | 15% | 2% |
| <u>Pedagogy</u> | | | |
| Managing multiple levels of understanding of math content e.g. <i>"I would like to know how teachers deal with multi-level students (low-med-high) when teaching math. Grouping, etc."</i> | 44% | 50% | 6% |
| Assessment of student's mathematical thinking e.g. <i>"Initial assessment I can use to get a clear picture of where students are in math skills/understanding."</i> | 44% | 53% | 3% |

| | | | |
|--|-----|-----|----|
| Make math fun/exciting/ interesting/connected to real life “Songs, dances or other ideas that can make students more motivated in math.” | 66% | 33% | 1% |
| Balance between skills and problem solving e.g. “I am aware of many effective manipulatives and strategies to use for teaching math, most which involve the use of hands-on engagement and exploration of mathematical concepts. How do I directly, effectively, and meaningfully relate these activities to the procedures students need to know?” | 51% | 45% | 4% |

Collegiality

| | | | |
|---|-----|-----|----|
| Meetings/ building relationship with other teachers “I would like to build a professional relationship with colleagues.” | 85% | 15% | 0 |
| Work with grade level groups/ grade level activities e.g. “I’d like to see support specific to my grade level.” | 77% | 22% | 1% |

“ I would like to meet with a teacher who has taught my grade level.”

b. Retention Data. Project RENEW is a retention and renewal program designed to answer the needs outlined in the Glenn Commission Report *Before It’s Too Late*, that is, the need to retain effective teachers in the profession. Project RENEW is developing and testing a model of professional development on two fronts that is designed to support, and thus retain, beginning teachers and at the same time to improve teachers’ understanding of mathematics and pedagogy. In addition, experienced teachers’ leadership capabilities are developed and a sense of renewal of purpose for the teaching profession is gained. For beginning teachers, called Preceptees, RENEW focuses on the first five years of teaching and welcomes teachers working on their credentials, unlike many other new teacher support programs. Project RENEW has collected and analyzed data from all nine districts pertaining to retention of new teachers and will continue to collect retention data on

an on-going basis. This section will report the preliminary analyses of data on teacher retention. Four categories were created, which correspond with state reporting procedures, to record retention data on beginning teachers participating in Project RENEW. The four categories relate the possible outcomes for teachers in the field, notably: a) Teachers who continue to teach in the district in which they were initially hired, b) Teachers who continue to teach but are now teaching in another district, c) Teachers who are no longer teaching or involved in the education profession, d) Teachers who are not teaching in their original district, whose information may be unknown. Teachers on leave from the district for child bearing or other reasons were included in the first category as retained in the district. Teachers who have other educational responsibilities in the district, such as curriculum leaders, mentors, coaches, or Peer Assistance and Review providers, and have the capacity to return to the classroom were also assigned the first category. Former RENEW participants who may be finishing their credential and are currently not teaching or working for a school district, were assigned the third category, Not Teaching.

Each school district and county office collects retention data on the first two years of new teachers' professional life in order to report retention statistics to the state of California. Retention data pertaining to the first five years of beginning teachers' professional life are not systematically collected by the districts. Often, teachers leave districts without an exit interview and it is not known whether the teachers remain in the profession. The financial crisis affecting the state of California and the education budget created concern and necessity for quick action at the

district level in the state. Some Project RENEW districts distributed “pink slips,” or notices of intent not to rehire, to every teacher in their district. Some districts gave notices to all new teachers. Although this on-going financial crisis affected school budgets and hiring decisions, it was found that retention of beginning teachers in the RENEW project fared slightly better in comparison to the new teachers as a whole, who are participating in the on-going, county-wide Beginning Teacher Support and Assistance Program (BTSA). In October 2003, Ventura County BTSA program reported that 85% of the first and second year teachers undergoing the BTSA program in 2001 and 2002 were still teaching as of October 2003. The BTSA data was collected from all 21 school districts in Ventura County. In comparison, 93% of the teachers who began Project RENEW in 2001 and 2002 are still teaching. This year our preliminary data show that between 88% and 96% of the teachers who began RENEW in either Year I, II, or III are still teaching. Table 7 shows these percentages, while Table 8 shows the percentage of RENEW experienced teachers in the four retention categories and indicates a 99% retention rate.

Table 7. *Retention of Project RENEW Preceptees*

| Retention of RENEW Beginning Teachers | Number of Year I, Year II and Year III Preceptees (N=325) |
|---------------------------------------|---|
| Still Teaching in District | 287 |
| Still Teaching in Profession | 5 |
| Preceptees Not Teaching | 10 |
| Don't know yet | 23 |

Table 8. *Retention of Project RENEW Preceptors*

| Retention of RENEW Preceptors | Number of Year I, Year II and Year III Preceptees (N=72) |
|-------------------------------|--|
| Still Teaching in District | 69 |
| Still Teaching in Profession | 2 |
| Preceptees Not Teaching | 1 |
| Don't know yet | 0 |

Full results of a summative study that examines retention rates of beginning teachers that have participated in RENEW will be reported after Year 5 of RENEW.

Section C: Key Accomplishments of Project RENEW in Year IV

- This year RENEW is impacting 197 participants from nine school districts.
- Seven additional experienced teachers joined the Cohort II Preceptors cadre.
- During the summer of 2004, Cohort II, in consort with the leadership team, designed and delivered nine Beginning Teachers Institutes (for teachers in their first 5 years of teaching) at their districts.
- The 33-member Cohort II Preceptors took over full leadership responsibilities for the 79 returning and 82 new Preceptees that signed up for year-long participation at their schools and districts.
- The leadership team will offer/has offered:
 - A three-day Leadership Retreat for Cohort II Preceptors
 - 6 Preceptor Seminars for the Cohort II Preceptors
 - One Half Day Seminar for participating Administrators
 - Two Reunion Days for Cohort I Preceptors
- Each Preceptor team will offer over 22 hours of Mathematics Education Professional Seminars to their Preceptees.

Section D: Key Strengths of Project RENEW

- An innovative three-tiered model of professional development that works to develop leadership capacity in experienced teachers who in turn are supported and renewed as they create communities of effective mathematics practices with the beginning teachers that work in their own district and school contexts.
- A professional development model that is adaptable to individual contexts and mandates of each district.
- A continued focus on equity issues in each seminar for Preceptors and Preceptees has enabled teachers to better understand the students of color and English language learners who populate the classrooms of the districts in the projects.
- Partnerships between the leadership team and the district teams that is responsive to the needs of the leaders of school site professional development.

Section E: Challenges for the Coming Year for Project RENEW

- *Focus in Schools and Districts on Literacy.* The strong focus on literacy continues, resulting in other content areas being given little or no time in classrooms or in professional development. In some of the districts in which we work, teachers are concerned that there is now no professional development in mathematics taking place other than RENEW.
- *Less Flexibility for Curriculum Decisions by Teachers.* One of the consequences of the increased focus on literacy is that the amount of instructional time and the scheduling of Language Arts and English Language Development are often set at the district level. Some of the districts in which we work require elementary teachers to spend almost all of the morning on literacy, leaving limited time for instruction of mathematics or other subjects, which are usually relegated to the afternoon. In addition, pacing guides that attempt to cover all of the too-numerous California Math Standards undermine teachers' desire and efforts to teach their students rather than teach the math textbook.
- *Impact of NCLB and California's Accountability System.* As more schools in California are designated "Program Improvement" schools, they face additional requirements, placing specific demands on teachers' time and attention. We think this is particularly difficult for newer teachers whose confidence and skills in teaching mathematics for understanding is still developing.
- *District Funding.* California's budget situation means that districts are unsure of how much funding they will have to support Preceptees' participation in RENEW next year. In addition, there are more restrictions placed on the ways in which they can use available funds. This makes it difficult for preceptors to plan ahead, and adds to the challenges of releasing Preceptees to visit other teachers' classrooms.
- *Administrators' Time, Attention, and Support.* The accountability requirements continue to place enormous pressure on administrators at all levels. Those who understand and are committed to teaching mathematics for understanding are generally more supportive of the teachers in RENEW. However, those who continue to see mathematics as merely procedures to be practiced and memorized or do not have strong teaching backgrounds, have a more difficult time understanding what the Preceptees are trying to do when they design lessons that help develop students' conceptual understanding and problem solving skills.

Section F: Looking Ahead to Year Five

One of our goals for this project is to increase leadership capacity for mathematics education in districts. We want to help schools and districts support efforts to improve mathematics instruction that is consistent with the NCTM Principles and Standards. In addition, it is important that teacher leaders have the skills and resources to promote equitable practice in classrooms and schools in ways that support every child as a mathematics learner. Our focus for the coming year will be on increasing and sustaining this leadership capacity. Some of the ways in which we will do this include:

- 1) Making this focus the central theme of the one-week leadership institute for Cohort II Preceptors in August, 2005. Together with the preceptors, we will develop specific strategies for meeting this goal that we (project staff and preceptors) hope to implement in the coming year.
- 2) Incorporating our findings from the experiences of the Cohort I Preceptors during Year 4 of the project (when they were not as intensely involved as in prior years) and seeking the input of Cohort I Preceptors to further inform the development and implementation of these strategies.
- 3) Working with administrators and both preceptor cohorts at the district level to address the issue of sustaining the leadership for mathematics education developed through Project RENEW.
- 4) Exploring the possibility of conducting a leadership development institute in mathematics education during summer 2005 for teachers who have

been Preceptees for a minimum of one year and now have over four years of teaching experience. We see strong leadership potential among the Preceptees and view this as a way to (a) expand and invigorate existing leadership; (b) further strengthen these Preceptees' knowledge of mathematics content and pedagogy; and (c) encourage these Preceptees to stay in and contribute to the profession by helping them see themselves as a valued part of the teaching profession.

In addition to the focus on developing and sustaining leadership for mathematics education, we will concentrate this year on synthesizing and writing about what we've learned from our work in this project. This includes sharing what we've learned about supporting and retaining teachers during their first five years in the profession, working with new teachers to increase their capacity to teach mathematics effectively, and developing teacher leadership for mathematics education. We will also complete a resource manual, which will be useful for others who would like to implement this model of leadership development for experienced teachers and support for newer teachers in mathematics education.

Section G: References

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Section H: Articles, Conference Papers and Presentations

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Hough, S; Erbes, S; O'Rode, N. (2004). *Understanding and Addressing Beginning Teacher Needs and Concerns: The Effects of Pr*

Hough, S; Erbes, S. (2004). Understanding and Addressing Beginning Teachers' Needs, Concerns and Difficulties: A Description of a Retention and Renewal Project in Mathematics Education. Paper presented oject RENEW, A Retention and Renewal Project in Mathematics. Paper presented at the American Educational Research Association, San Diego, CA. April, 2004. at the Association of Teacher Educators 84th Annual Meeting Dallas, TX, February 15 - 19, 2004

Terman, N; O'Rode, N. (2004). *Project RENEW: Developing The Leadership of Experienced Teachers to Work With Beginning Teachers*. Paper presented at the New Teacher Center Symposium, San Jose, CA. February, 2004.

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Working Papers and Articles

1. Using Concept Maps to Measure Changes in Teachers Understandings of Algebra

Papers can be downloaded directly from <http://renew.education.ucsb.edu/research.htm> as they become available
Or by clicking on the research menu option of RENEW's new website:
<http://renew.education.ucsb.edu>

Appendix I: Evaluation Questions

Summary of Evaluation Questions, Sub Questions and Procedures to Evaluate Project Effects on the Preceptors

| Question 1: How is RENEW contributing to the Preceptors' development as leaders? | | | |
|--|---|--------------------|-----------------------------------|
| Sub-question | Data Collection | Respondents | Schedule |
| How does the project affect Preceptors' understanding of their "precepting" role? | Reflective Questionnaire | All Preceptors | Pre/post project year |
| What successes and challenges have Preceptors faced in their role? | Reflective writings | All Preceptors | March |
| What are the characteristics of effective Preceptee/Preceptor relationship? | Interview | All Preceptors | Jan-March |
| Question 2: How does RENEW affect Preceptors' understandings of mathematics? | | | |
| Sub-question | Data Collection Approach | Respondents | Schedule |
| What opportunities for learning/ re-experiencing mathematics content are Preceptors given? | Participant and non-participant observations, video archives | Preceptors | Preceptor institutes and seminars |
| How has project renew affected Preceptors' understandings of mathematics content | Interviews, classroom observations (tie in to the mathematics culture of the classroom) | Preceptors | Ongoing |
| Question 3. How does the project affect Preceptors' pedagogical knowledge (as portrayed in the PPSM)? | | | |
| Sub-question | Data Collection Approach | Respondents | Schedule |
| How do Preceptors view an "ideal" mathematics classroom? | Questionnaire | All Preceptors | Pre/post academic year |
| How do these understandings play out in MEPS? In their classrooms? | | | |

Summary of Evaluation Questions, Sub Questions and Procedures to Evaluate Project Effects on the Preceptees

| Question1: How Does RENEW affect Preceptees' understandings, beliefs and practices about mathematics? | | | |
|---|---|----------------------------------|------------------------|
| Sub-question | Data Collection Approach | Respondent s | Schedule |
| How prepared do Preceptees feel to implement "investigative" mathematics? | Questionnaire | All Preceptees | Pre/post academic year |
| What are Preceptees' beliefs about teaching mathematics? | Questionnaire Feedback | All Preceptees All Preceptees | Pre/post academic year |
| Question 2: How is the project affecting Preceptees' understandings, beliefs and practices about mathematics pedagogy? | | | |
| Sub-question | Data Collection Approach | Respondent s | Schedule |
| What is happening in Preceptees' classrooms? | Classroom Observations | Preceptee sub-sample | Jan-Feb |
| Has RENEW affected their view of teaching mathematics? | Interview | Preceptee sub-sample | Jan-Feb |
| Question3: How is the project affecting the retention of the Preceptees? | | | |
| Sub-question | Data Collection Approach | Respondent s | Schedule |
| What are the self-perceived needs of Preceptees and are these needs being met? | Questionnaire, Feedback from first few MEPS | All Preceptees | Pre/post academic year |
| Compared to a matched sample, do more RENEW beginning teachers remain in the teaching profession? | Document Analysis Questionnaire | District data Matched sample | Post project |

Appendix II: The Beliefs About Teaching Mathematics Scale

Alpha = .73

1. Using cooperative learning techniques in mathematics instruction is not appropriate for high achieving students.
 2. In mathematics students cannot understand high level concepts until they have mastered the "basic" steps of a given procedure or algorithm.
 3. When teaching mathematics the teacher should demonstrate the mathematics steps clearly and slowly and then give students time to learn the steps by repetition.
 4. Students generally learn mathematics best in classes/groups with students of similar abilities.
 6. The best way for students to learn mathematics is to do many similar types of problems until they get the procedure down.
 7. It is better to teach mathematical ideas directly to students than to let them figure out relationships for themselves.
 8. When working with slow learners in mathematics teachers should focus a lot of instruction on "basic skills."
 9. To learn math students should be given plenty of opportunities to engage in inquiry oriented activities.
 10. Encouraging students to make conjectures in mathematics is not necessary because the purpose of instruction is to get them to remember and apply math facts.
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Appendix III: Sample Project RENEW Classroom Observation Report. Grade 1.

Pre Observation Questions

Q: What have your students been working on (in mathematics) recently?

Over the past few weeks we have been working on basic addition and subtraction with single digit numbers.

Q: What mathematics will your students be working on when I observe?

I will be introducing place value. The students have seen 10's and 1's in the straw chart we do when we do calendar but have had little other work with place value. I will have the students count objects by placing them into groups of tens and extras (ones) and then we will be working with base 10 blocks and building numbers.

Q: What are the next steps for this class?

We will be working on place value for the next month or two. The very next lesson we will be manipulating the 100 chart and then we will build a 100 chart with base ten blocks so that students can have a visual representation of what each number really means. After that we will play a variety of place value games and finally we will complete any pages on place value that are found in the textbook.

Q: Is there anything I should know about these students?

I have a good class and most of the students are on grade level. I have one new student that I am not sure how she will work and I have another student that has been in Mexico for the past two months and if he is back I will need to make special accommodations for.

Observation of Lesson

Date: 12/19/05

Rio Del Norte School

Contextual Background: Grade level, number of students, number of students of color.

The classroom observed was first grade, with 19 students (CSR). Four of the students in the class were English Learners, seven additional students were Hispanic, one was Egyptian, one other student of color from unknown country and the remaining six were Caucasian.

Short Description of the Lesson.

This 1.5 hour long lesson was designed to introduce the students to place value in a formal manner. They had previously worked extensively with bundles of straws, representing hundreds, tens and ones in their work on the calendar (counting how many days they had been in school, etc). This lesson started off with the calendar and then was extended to include pv in another context and at the same time tie the activity to the formal notion of place value positions in written numerals. The activities included both whole class (on the carpet) and pairs work as they counted items into “tens” using a variety of manipulatives. The students then moved onto explore base 10 blocks as a way of representing 10s and 1s.

Major content area of lesson.

Place value understanding

How closely did the lesson adhere to the instructions provided in the teacher’s manual?

Exactly Almost totally Mostly Somewhat Hardly at all

N/A - This lesson was instructor made and did not utilize the district adopted text (Houghton Mifflin)

Which California Content Standards did this lesson cover?

Number Sense

- 1.0 Students understand and use numbers up to 100:
 - 1.1 Count, read, and write whole numbers to 100.
 - 1.4 Count and group object in ones and tens (e.g., three groups of 10 and 4 equals 34, or $30 + 4$).
- 2.0 Students demonstrate the meaning of addition and subtraction and use these operations to solve problems:
 - 2.4 Count by 2s, 5s, and 10s to 100.
- 3.0 Students use estimation strategies in computation and problem solving that involve numbers that use the ones, tens, and hundreds places:
 - 3.1 Make reasonable estimates when comparing larger or smaller numbers.

Mathematical Reasoning

- 1.2 Use tools, such as manipulatives or sketches, to model problems.

2.0 Students solve problems and justify their reasoning:

2.1 Explain the reasoning used and justify the procedures selected.

Which NCTM standards did this lesson cover?

Number and Operations

Understand numbers, ways of representing numbers, relationships among numbers, and number systems:

- count with understanding and recognize "how many" in sets of objects;
- use multiple models to develop initial understandings of place value and the base-ten number system;
- develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections;
- develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers;
- connect number words and numerals to the quantities they represent, using various physical models and representations;

Problem Solving

- build new mathematical knowledge through problem solving;
- solve problems that arise in mathematics and in other contexts;
- apply and adapt a variety of appropriate strategies to solve problems;

Communication

- organize and consolidate their mathematical thinking through communication;
- communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- analyze and evaluate the mathematical thinking and strategies of others;
- use the language of mathematics to express mathematical ideas precisely.

Reasoning and Proof

- recognize reasoning and proof as fundamental aspects of mathematics;
- develop and evaluate mathematical arguments and proofs;

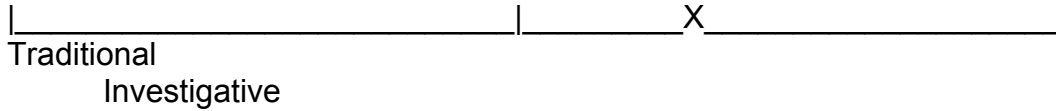
Please provide any additional information you consider necessary to capture the activities or context of this lesson. Include comments on any feature of the class that is so salient that you need to get it on the table right away.

The extended time for this mathematics lesson really helped students investigate p.v.

Indicators

Design

Was the overall design of this lesson Investigative or Traditional



| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. The design of the session reflected careful planning and organization. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. The instructional strategies and activities used in this lesson reflected attention to students' experience, preparedness, and/or learning styles. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. The resources available in this lesson contributed to accomplishing the purposes of the instruction. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. The instructional strategies and activities reflected attention to issues of access, equity, and diversity for students. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Adequate time and structure were provided for reflection. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Adequate time and structure were provided for wrap-up and closure. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. Design for future instruction takes into account what transpired in the lesson. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- Lesson built thoughtfully on what students knew and understood previously
- A variety of manipulatives, including MathLand base 10 blocks were used
- The use of hands-on modeling and pairs work were used whenever appropriate.

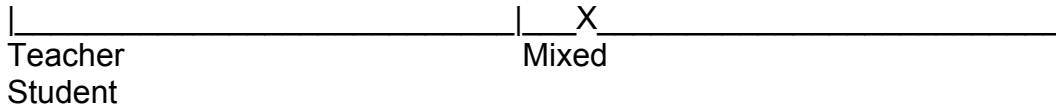
Implementation

| | not at all | | | | to a great extent | don't know | N/A |
|---|---------------|---|---|---|-------------------------|---------------|-----|
| 1. The teacher appeared confident in his/her ability to teach mathematics | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. The teacher's classroom management style/strategies enhanced the quality of the lesson. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. The pace of the lesson was appropriate for the developmental levels/needs of the students and the purposes of the lesson. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. The teacher took into account prior knowledge of students. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. The teachers' questioning strategies were likely to enhance the development of student conceptual understanding/problem solving. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. The lesson was modified as needed based on teacher questioning or other student assessments. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- Teacher questioning strategies encourages student ownership of mathematics.
- Student answers were challenged by the teacher and justification of answers were expected.
- Lesson proceeded from what students already knew.

Classroom Culture

Was the overall culture of this lesson teacher centered or student centered?



| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
| 1. Interactions reflected collaborative working relationships among students (e.g. students worked together, talked with each other about the lesson). | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Interactions reflected collaborative working relationships between teacher and student. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Active participation of all was encouraged and valued. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. There was a climate of respect for students' ideas, questions, and contributions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. The teacher's language and behavior clearly demonstrated sensitivity to issues of gender, race/ethnicity, special needs, LEP, culture and/or SES. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Opportunities were taken to recognize and challenge stereotypes and biases that became evident during the lesson. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. The climate of the lesson encouraged students to generate ideas, questions, conjectures, and/or propositions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. Intellectual rigor, constructive criticism, and the challenging of ideas were valued. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- Teacher drew out students who didn't volunteer information during pairs and whole class discussions
- Teacher often asked "thumbs up who agree" and "thumbs down who disagrees". Ideas were then challenged among classmates.

Overall Ratings of the Lesson

| | Not at all | | | | To a great extent | Don't know | N/A |
|--|------------|---|---|----------|-------------------|------------|----------|
| 1. Students' understanding of mathematics as a dynamic body of knowledge generated and enriched by investigation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Students' understanding of important mathematics concepts | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Students' capacity to carry out their own investigations and inquiries | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. Students' ability to apply or generalize skills and concepts to other areas of mathematics, other disciplines or real life situations | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Students' self-confidence in doing mathematics | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Students' interest in and/or appreciation for math | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Overall Rating: 5 (See attached videotape)

Level 5: Exemplary Instruction

Instruction is purposeful and all students are highly engaged most or all of the time in meaningful work (e.g., investigation, teacher presentations, discussions, reading). The lesson is well-designed, artfully implemented, with flexibility and responsiveness to students' needs and interests. Instruction is highly likely to enhance most students' understanding of the discipline and develop their capacity to successfully "do" mathematics.

Post Observation Conference

Q: So how did you think the lesson went today?

I think they did really well. My objective was for them to understand what it really means to have a group of ten and a group of one. I haven't done a whole lot with

connecting it to the abstract number. I know that they wrote the number and they have a pretty good idea, but tomorrow I'm going to be working with a hundreds chart and connecting those two a lot more. The only thing they've done with this at all is a straw chart. When we get the calendar, a calendar is not something that I do daily, but they've seen that and they see usually put one in and then we get a group of ten and we move it over to the ten's place, so they know the terms tens and ones from that. So when I started my lesson connecting the work that we were doing to the straw chart. I would say everybody got it for the level of understanding that's required for district assessment, where they just see three tens and five ones and they just write three and five, I think every single kid in this class can do that. To get a real deeper understanding was where I was going through and I purposely do things wrong to see if they can catch it and when they don't catch it, it shows me that they're doing the work, but they don't understand exactly what they're doing and so there are some kids that do need a deeper understanding.

Q: How do you feel about teaching mathematics?

I love teaching math, I love all the subjects. Teaching reading, at this level, is so great because you get to see them read, and their progress is huge day to day. Math, I just love math, and I would teach math all day if I had the opportunity.

Q. Why did you originally sign-up for RENEW?

I signed up because _____, who's a teacher here, said 'hey there's this really good program, you do math after school. You get paid for it, it's on Fridays, it's a good group, there's support for new teachers.' So I said 'ok, other people are going, I'll give it a try.'

Q. How was it similar or different than what you expected?

It's been very, very well run. The meetings are fun. It's everything that BTSA should be.

Q. What do you find most useful about RENEW?

Every single BTSA evaluation I've been asked to do, I say 'you need to go talk to the people at RENEW ' because it seems to me that the philosophies are the same, support for new teachers, give them ideas, we have mentor people who can help and observe you and all this stuff. But, it's supporting and comforting through Project RENEW, and in BTSA it's 'here's a list of paperwork you need to do and here are the due dates' where in RENEW it's 'here are some actual teaching strategies and some activities that you can use at your grade level and here are the handouts for them so that you can produce them tomorrow if you want to do it, and let's play these games together.' And then, getting into other issues, I think it's cool that it's not just math, although math is a full 75% of it, but getting into other issues of discrimination and equity and all these other things. It's been really, really good.

If I had to do BTSA on a Friday afternoon, I would be pissed, and that was mandatory. RENEW is optional and I have no problem giving up a Friday afternoon for that. One of the meetings, it was a Saturday, I think about two years ago, and the meeting ended at 3:30 and everyone ended up staying until 4:30 and were just like 'no, we want to finish this.' That would have never happened at BTSA.